Study Strategy

Exercises 35, 36 If students have trouble identifying the initial amount, the growth factor, and the annual percent increase for these models, have them rewrite the given equations by replacing 2.47 in Exercise 35 with $1 + 1.47$, and replacing 1.50 in Exercise 36 with $1 + 0.50$. Then tell them to write the general exponential growth model equation $y = a(1 + r)^t$ directly below the rewritten equations and match up the values of a, the initial amount, r, the annual percent increase, and $1 + r$, the growth factor.

Avoiding Common Errors

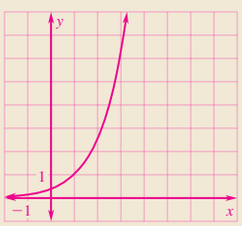
Exercises 37, 38 Many students forget to divide r by n and/or multiply t by n in solving compound interest problems. Refer them to the formula on page 481.

Internet Reference

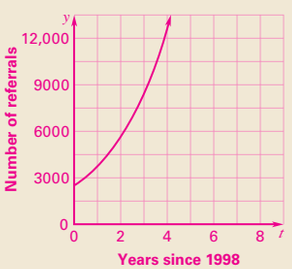
Exercise 41 More information about the Minnesota Vikings can be found at www.vikings.com

Exercise 42 Additional information about the bald eagle can be found at the American Eagle Foundation's site at www.eagles.org/moreabout.html

35b.



36b.



PROBLEM SOLVING

EXAMPLE 4 on p. 480 for Exs. 35–36

35. DVD PLAYERS From 1997 to 2002, the number n (in millions) of DVD players sold in the United States can be modeled by $n = 0.42(2.47)^t$ where t is the number of years since 1997.

a. Identify the initial amount, the growth factor, and the annual percent increase. **0.42 million, 2.47, 147%**

b. Graph the function. Estimate the number of DVD players sold in 2001. **See margin for art; about 16 million DVD players.**

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36. INTERNET Each March from 1998 to 2003, a website recorded the number y of referrals it received from Internet search engines. The results can be modeled by $y = 2500(1.50)^t$ where t is the number of years since 1998.

a. Identify the initial amount, the growth factor, and the annual percent increase. **2500, 1.50, 50%**

b. Graph the function and state the domain and range. Estimate the number of referrals the website received from Internet search engines in March of 2002. **See margin for art; domain: $t \geq 0$, range: $y \geq 2500$; about 13,000 referrals.**

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EXAMPLE 5 on p. 481 for Exs. 37–38

37. ACCOUNT BALANCE You deposit $2200 in a bank account. Find the balance after 4 years for each of the situations described below.

a. The account pays 3% annual interest compounded quarterly. **$2479.38**

b. The account pays 2.25% annual interest compounded monthly. **$2406.98**

c. The account pays 2% annual interest compounded daily. **$2383.23**

38. DEPOSITING FUNDS You want to have $3000 in your savings account after 3 years. Find the amount you should deposit for each of the situations described below.

a. The account pays 2.25% annual interest compounded quarterly. **$2804.71**

b. The account pays 3.5% annual interest compounded monthly. **$2701.39**

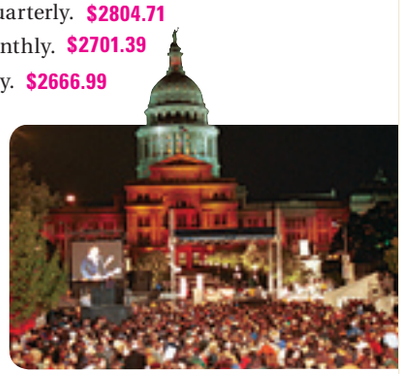
c. The account pays 4% annual interest compounded yearly. **$2666.99**

39. MULTI-STEP PROBLEM In 1990, the population of Austin, Texas, was 494,290. During the next 10 years, the population increased by about 3% each year.

a. Write a model giving the population P (in thousands) of Austin t years after 1990. What was the population in 2000? **$P = 494.29(1.03)^t$; 664,284 people**

b. Graph the model and state the domain and range. **See margin for art; domain: $t \geq 0$, range: $P \geq 494.29$.**

c. Estimate the year when the population was about 590,000. **1996**



Austin, Texas

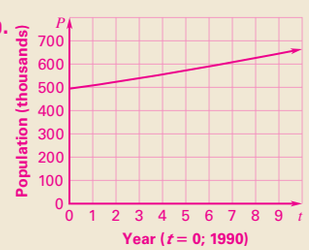
40. ★ SHORT RESPONSE At an online auction, the opening bid for a pair of in-line skates is $50. The price of the skates increases by 10.5% per bid during the next 6 bids.

a. Write a model giving the price p (in dollars) of the skates after n bids. **$p = 50(1.105)^n$**

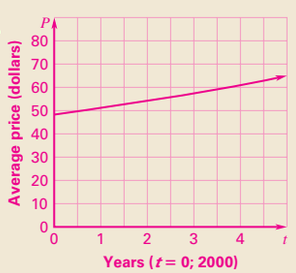
b. What was the price after 5 bids? According to the model, what will the price be after 100 bids? Is this predicted price reasonable? *Explain*. **$p(5) \approx \$82.37$; $p(100) \approx \$1,084,420.72$; no. *Sample answer:* This amount is unreasonable because the model is only defined for 6 bids and 100 is out of this domain.**

○ = WORKED-OUT SOLUTIONS on p. WS1 ★ = STANDARDIZED TEST PRACTICE ◆ = MULTIPLE REPRESENTATIONS

39b.



41b.



42b.

t	n
0	41
8	81.097
24	317.29

41c. *Sample answer:* Since the function is only defined when t is between 0 and 4, you can look at the graph between these values to determine the minimum or maximum that gives meaningful results.

41. ★ **EXTENDED RESPONSE** In 2000, the average price of a football ticket for a Minnesota Viking's game was \$48.28. During the next 4 years, the price increased an average of 6% each year.

a. Write a model giving the average price p (in dollars) of a ticket t years after 2000. $p = 48.28(1.06)^t$

b. Graph the model. Estimate the year when the average price of a ticket was about \$60. See margin for art; 2003.

c. *Explain* how you can use the graph of $p(t)$ to determine the minimum and maximum t-values in the domain for which the function gives meaningful results.

42. **MULTIPLE REPRESENTATIONS** In 1977, there were 41 breeding pairs of bald eagles in Maryland. Over the next 24 years, the number of breeding pairs increased by about 8.9% each year.

a. Writing an Equation Write a model giving the number n of breeding pairs of bald eagles in Maryland t years after 1977. $n = 41(1.089)^t$

b. Making a Table Make a table of values for the model. See margin.

c. Drawing a Graph Graph the model. See margin.

d. Using a Graph About how many breeding pairs of bald eagles were in Maryland in 2001? about 317 breeding pairs

43. No. *Sample answer:* The initial amount is all that is equivalent. The first \$6000 amount grows at a faster rate. C

43. **REASONING** Is investing \$3000 at 6% annual interest and \$3000 at 8% annual interest equivalent to investing \$6000 (the total of the two principals) at 7% annual interest (the average of the two interest rates)? *Explain*.

44. **CHALLENGE** The yearly cost for residents to attend a state university has increased from \$5200 to \$9000 in the last 5 years.

a. To the nearest tenth of a percent, what has been the average annual growth rate in cost? 11.6%

b. If this growth rate continues, what will the cost be in 5 more years? \$15,582.79

MIXED REVIEW

PREVIEW Prepare for Lesson 7.2 in Exs. 45–52.

Evaluate the power.

45. $(0.6)^3$ *(p. 10)* 0.216 **46.** $(0.4)^2$ *(p. 10)* 0.16 **47.** $(0.5)^5$ *(p. 10)* 0.03125 **48.** $(0.25)^3$ *(p. 10)* 0.015625

49. $\left(\frac{1}{2}\right)^4$ *(p. 330)* $\frac{1}{16}$ **50.** $\left(\frac{3}{8}\right)^3$ *(p. 330)* $\frac{27}{512}$ **51.** $\left(\frac{7}{10}\right)^5$ *(p. 330)* $\frac{16{,}807}{100{,}000}$ **52.** $\left(\frac{4}{5}\right)^3$ *(p. 330)* $\frac{64}{125}$

Factor the expression.

53. $x^2 + 7x - 30$ *(p. 252)* $(x + 10)(x - 3)$ **54.** $x^2 + 15x + 54$ *(p. 252)* $(x + 9)(x + 6)$ **55.** $2x^2 - 7x - 30$ *(p. 259)* $(2x + 5)(x - 6)$

56. $12x^2 - 5x + 25$ *(p. 259)* not factorable **57.** $x^3 - 2x^2 - 3x + 6$ *(p. 353)* $(x^2 - 3)(x - 2)$ **58.** $x^3 - 64$ *(p. 353)* $(x - 4)(x^2 + 4x + 16)$

Solve the equation. *(p. 414)*

59. $x^5 = 3125$ 5 **60.** $3x^3 = 1029$ 7 **61.** $x^7 + 8 = -64$ $\sqrt[7]{-72}$

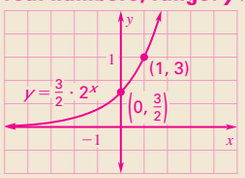
62. $(x + 12)^4 = 52$ $-12 \pm \sqrt[4]{52}$ **63.** $-5x^6 = -1000$ $\pm\sqrt[6]{200}$ **64.** $(x - 9)^8 = 17$ $9 \pm \sqrt[8]{17}$

5 ASSESS AND RETEACH

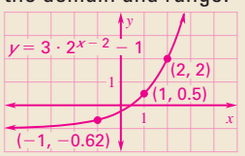
Daily Homework Quiz

Transparency Available

1. Graph $y = \left(\frac{3}{2}\right) \cdot 2^x$. State the domain and range. domain: all real numbers; range: $y > 0$



2. Graph $y = 3 \cdot 2^{x-2} - 1$. State the domain and range.



domain: all real numbers; range: $y > -1$

3. You deposit \$1500 in an account that pays 3% annual interest compounded daily. What will be the balance in your account after 1 year? \$1545.68

Online Quiz

Available at **classzone.com**

Diagnosis/Remediation

- Practice A, B, C in Chapter 7 Resource Book, pp. 6–8
- Study Guide in Chapter 7 Resource Book, pp. 9–10
- Practice Workbook, pp. 108–109
- @HomeTutor

Challenge

Additional challenge is available in the Chapter 7 Resource Book, p. 13.

42c.